



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/709,278	04/26/2004	Wen-Liang Lien	NAUP0560USA	3277
27765	7590	02/21/2006	EXAMINER	
NORTH AMERICA INTELLECTUAL PROPERTY CORPORATION			LEE, KYOUNG	
P.O. BOX 506			ART UNIT	
MERRIFIELD, VA 22116			PAPER NUMBER	
			2812	

DATE MAILED: 02/21/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/709,278	LIEN ET AL.	
	Examiner	Art Unit	
	Kyoung Lee	2812	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04/26/2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Art Unit: 2812

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-13 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Applicant has not provided any material choice that would prevent unpolymerized precursors diffusing out from the low-k dielectric layer from contacting an overlying resist and because applicant did not provide any material choice, there is no evidence that the blocking layer would prevent unpolymerized precursors diffusing out from the low-k dielectric layer from contacting an overlying resist.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 8, and 9 are rejected under 35 U.S.C. 102(b) as being anticipated by Chung-Shi Liu (U.S. Patent No. 6,294,457).

Art Unit: 2812

In claim 8, Liu disclose a method for a damascene process capable of avoiding via resist poisoning, the damascene process comprising:

Providing a semiconductor substrate with a low-k dielectric layer ($k \leq 2.9$) thereon (18), and a SiC layer over the low-k dielectric layer (20);

Forming a blocking layer on the SiC layer (22), wherein the blocking layer is used to prevent unpolymerized precursors diffused out from the low-k dielectric layer from contacting an overlying resist;

Forming a BARC layer on the blocking layer (24);

Forming a resist layer on the BARC layer (30), where the resist layer has a via opening to expose a portion of the BARC layer; and

Etching through the BARC layer, the blocking layer, and the SiC layer, and etching a portion of the low-k dielectric layer to form a single damascene structure in the low-k dielectric layer (see figure 3 and column 2, line 66 through column 3, line 27).

In claim 9, Liu disclose a method for wherein the blocking layer is formed by Ar plasma hitting the SiC layer (see column 3, lines 10-16).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 2812

Claim 12 rejected under 35 U.S.C. 103(a) as being unpatentable over Chung-Shi Liu (U.S. Patent No. 6,294,457) in view of Chang et al (U.S. Patent No. 6,642,153).

In claim 12, Liu disclose the method as claimed and rejected above, but does not teach the method forming a low-k dielectric layer comprises a carbon-doped oxide substance. Chang disclose the method forming a low-k dielectric layer comprises a carbon-doped oxide substance (see column 4, lines 40-44). It would have been obvious to one of ordinary skill in the art at the time the invention was made to wherein the low-k dielectric layer comprises a carbon-doped oxide substance in the method of Liu in order to lower value of k dielectric layer and to protect the low k carbon doped silicon oxide dielectric material from damage during removal of photoresist mask.

Allowable Subject Matter

Claim 1 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, first paragraph, set forth in this Office action.

Claims 2-7, and 13 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, first paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Claims 10-11 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Response to Amendment

The amendment filed on 1/05/06 under 37 CFR 1.131 has been considered but is ineffective to overcome the Chung-Shi Liu (U.S. Patent No. 6,294,457) and Chang et al (U.S. Patent No. 6,642,153) reference.

Claim 1 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, first paragraph, set forth in this Office action.

Claims 2-7 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, first paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

In claim 8, Applicant argued "Contrary to the additional layer 22 of Liu's teaching, the blocking layer of the present application is used to prevent unpolymerized precursors diffused out from the low-k dielectric layer from contacting and overlying resist. Applicant asserts that the blocking layer of the present application has different use and purpose from the additional layer 22 of Liu". The additional layer (22) comprising silicon dioxide would inherently block unpolymerized precursors diffused out from the low-k dielectric layer from contacting an overlying resist as compared with no additional layer between the SiC layer and BARC layer. Applicant has not provided any material choice that would prevent unpolymerized precursors diffusing out from the low-k dielectric layer from contacting an overlying resist. Claim 8 was invalid for disclosing no compound to accomplish the claimed result.

In claim 9, Applicant argued "Liu teaches the material of the additional layer which is the same with that used in Ar plasma sputter chamber, not instructs that the additional layer is formed by Ar plasma sputtering or hitting". Liu teaches additional layer 22 comprises silicon dioxide, which is the same material as comprises the wall of the Ar sputter chamber. Sputtering system is used to form a metal layer by Ar plasma hitting the wall and depositing the same material as the wall of sputter chamber. This means that additional layer is made from Ar plasma sputtering process and that is why additional layer 22 and the walls of the Ar sputter chamber are identical.

Claims 10 and 11 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent from including all of the limitations of the base claim and if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Claim 12 is dependent on claim 8 and it is ineffective to overcome the Chung-Shi Liu (U.S. Patent No. 6,294,457) and Chang et al (U.S. Patent No. 6,642,153) reference.

Claim 13 is objected because claim 13 is dependent on claim 1 not on claim 8.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kyoung Lee whose telephone number is (571) 272-1982. The examiner can normally be reached on M-F 8:30AM - 5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael S. Lebentritt can be reached on (571) 272-1873. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KL


MICHAEL LEBENTRITT
SUPERVISORY PATENT EXAMINER